

# Evaluation of Saudi camel calves' performance under an improved management system

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## Key words

Dromedary - Young animal - Mortality - Growth - Saudi Arabia.

## Summary

This study was carried out at the camel research station of the Range and Animal Development Research Center in Al Jouf, Saudi Arabia, under improved management feeding and veterinary care. During 14 seasons, 242 camel calves were born. Among them 137 (56.6%) were males and 105 (43.4%) were females. Birth weights were taken for 239 calves over 14 seasons. The average weight was 37.5 kg for 136 males and 37.3 kg for 103 females. The dam age and season affected the birth weight. Mortality was recorded in 38 (13.7%) camel calves between birth and three years of age. The average weight at three years was 489.3 kg and 486.6 kg for 32 males and 49 females, respectively.

## ■ INTRODUCTION

According to agricultural statistics, the camel population in Saudi Arabia was 790,000 in 1997 (7), which represented about 19% of the agricultural animals. However, it is facing a great challenge in the investment sector due to the lack of information about meat and milk production, calving rate, calf rearing, mortality and other essential questions related to camel husbandry. In spite of studies performed on growth rate (1, 3, 4, 5) and mortality rate in the camel (2, 6, 8), further studies are needed to provide more statistical data on camel performance and productivity.

The camel farm of the Range and Animal Development Research Center in Al Jouf was established about 16 years ago. Some camels delivered their eighth calf in the farm, which gives a good indication about camel productivity. Nearly 300 calves were born in the farm throughout the 16 years. Many data about camel husbandry, performance, production and reproduction were collected.

This study aimed to provide detailed information about the camel calves, season of delivery, birth weight, mortality rate, growth rate from birth to three years of age as well as some factors influencing birth weight and mortality rate.

## ■ MATERIALS AND METHODS

Data in this study were collected from the camel research station in Al Jouf from 1984 to 1999. The birth weight of most calves was recorded just after birth then weighing was performed every two

weeks until three years of age. Data about calves that died just after birth or up to the age of six months were used to study the calves' mortality rate. To study the influence of dam age on calf birth weight, only dams born in the farm were included.

Determination of seasons depended upon a clear separation of deliveries started from September to June of the following year. During the 16 production seasons, no single case of delivery was recorded at the farm in July or August.

## ■ RESULTS AND DISCUSSION

### *Incidence of deliveries*

Over 14 production seasons, 242 camel deliveries were recorded. The delivery season lasted for nine months from October to June (table I), which means that the mating season of camels may also extend over the same period as the gestation period ranging from 356 to 410 days. Peak of deliveries was observed in January (27.7%) and December (21.5%), the coldest months of the year, which may have been reflected on the mortality rate. Only two deliveries (0.8%) occurred in June. The percentage of male calves in this study was shown to be higher than that of female calves (1.31 vs. 1.00).

### *Birth weight*

The average birth weight of 239 calves by season and sex are presented in table II. The average birth weight, standard error and range of male and female calves were  $37.45 \pm 0.55$  kg, 19-50 kg, and  $37.27 \pm 0.41$  kg, 23-49 kg, respectively. Differences between sexes were not statistically significant. It seems that there was no risk of reaching 50 kg birth weight for newborn calves but

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Table I

Monthly distribution of deliveries

Sex	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
Male	6	11	31	40	18	16	8	6	1	137
Female	6	12	21	27	18	13	4	3	1	105
Total	12	23	52	67	36	29	12	9	2	242
%	5.0	9.5	21.5	27.7	15.0	12.0	5.0	3.7	0.8	100

Table II

Average birth weight of camel calves throughout the various seasons

Ser. Num.	Season	Male			Female		
		Num.	Average*	SE	Num.	Average*	SE
1	1984-85	7	38.29	1.00	3	35.00	2.40
2	1985-86	9	38.78	1.00	9	40.88	0.73
3	1986-87	4	40.50	0.56	3	40.00	0.00
4	1987-88	6	40.67	0.80	7	37.86	1.25
5	1988-89	12	40.00	1.03	4	39.00	0.50
6	1989-90	10	40.10	1.07	8	38.00	0.61
7	1990-91	11	38.00	0.65	9	34.56	1.00
8	1991-92	8	35.25	2.54	8	36.88	1.95
9	1992-93	8	36.63	1.13	6	40.00	0.00
10	1993-94	14	37.36	0.67	6	38.33	0.38
11	1994-95	11	32.72	1.93	7	34.14	1.94
12	1995-96	15	37.07	0.98	9	34.78	1.77
13	1996-97	4	38.50	1.60	10	36.30	0.94
14	1997-98	17	35.47	1.04	14	37.86	1.25

\* In kilograms

intensive care should be given to calves whose birth weight is less than 25 kg, especially during cold days. It was observed that among 136 deliveries of male calves, 70 (51.5%) were between 36-40 kg. The number of female calves in the same range was 57 (55.3%). More than 90% of the birth weights of male and female calves ranged from 31 to 45 kg suggesting that, in this study, it was the normal camel birth weight range.

#### Effect of season on birth weight

The season had a significant effect ( $p < 0.05$ ) on the birth weight, while under traditional management the season exerts its effect through the availability of feed, under the improved management conditions of this study the effect of season must be attributed to other factors such as the climate. However, further studies are required to investigate these factors.

#### Effect of dam age on birth weight

Birth weights by parity and sex are presented in table III. Minimum weights were recorded during the first delivery season (mother age 4-5 years). The average male and female weights of camel calves in the first delivery season were 34.48 and 34.66 kg, respectively. Low calves' weight during the first delivery

season may be attributed to the small size of the dam at that age. The correlation between the mother age and the birth weight of camel calves was:  $r = 0.869$  ( $p < 0.01$ ).

#### Calf mortality

Among 242 calves, 38 (13.7%) died between birth and six months of age; this reflects the management system influence on reducing the mortality rate. Mortality did not differ between male and female calves (table IV).

The monthly distribution of calf mortality is presented in table V. About 66% of mortalities occurred during the cold winter months. Therefore, it is important to keep dams near delivery in wind-protected places and to transfer newborn calves to warm isolated rooms at night and during cold days and expose them to sunlight when possible.

#### Calf growth rate

Weights at birth and at three years of 32 male and 49 female calves are presented in table VI. The average daily weight gain was calculated from group means. The difference between male and female mature weights was not significant. The growth rate and weight of mature camels proved that the camel could be used for fattening.

**Table III**

Effect of dam age on birth weight of camel calves

Mother age	Mean birth weight (kg $\pm$ SE)				Overall average
	N	Male	N	Female	
1st delivery (4-5 years)	37	34.48 $\pm$ 0.73	22	34.66 $\pm$ 0.69	34.57 $\pm$ 0.7
2nd delivery (6-7 years)	22	37.68 $\pm$ 0.73	15	37.44 $\pm$ 1.03	37.56 $\pm$ 0.93
3rd delivery (8-9 years)	15	36.58 $\pm$ 1.39	16	38.06 $\pm$ 0.92	37.32 $\pm$ 1.10
4th delivery (10-11 years)	7	38.13 $\pm$ 1.75	8	40.25 $\pm$ 1.48	39.19 $\pm$ 1.52
5th delivery (12-13 years)	5	40.60 $\pm$ 1.22	2	36.33 $\pm$ 0.27	38.47 $\pm$ 0.90

**Table IV**

Effect of dam age on mortality in camel calves

Mother age	Num. of deliveries		Mortality (%)	
	Male	Female	Male	Female
1st delivery (4-5 years)	42	27	7 (16.67%)	5 (18.5%)
2nd delivery (6-7 years)	25	18	3 (12.0%)	3 (16.67%)
3rd delivery (8-9 years)	12	17	2 (16.67%)	1 (5.88%)
4th delivery (10-11 years)	8	8	1 (12.5%)	-
5th delivery (12-13 years)	5	3	-	1 (33.3%)
Total	92	73	13 (14.1%)	10 (13.7%)

**Table V**

Monthly distribution of calf mortality

Sex	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Total
Male	1	1	5	5	4	2	2	1	21
Female	-	2	3	4	4	3	-	1	17
Total	1	3	8	9	8	5	2	2	38
%	2.6	7.9	21.1	23.7	21.1	13.2	5.2	5.2	100

**Table VI**

Growth rate of camel calves from birth to three years of age

Sex	Num. of animals	Average birth weight	SE	Average weight (3 years)	SE	Daily gain (g/d)
Males	32	39.94	0.61	489.31	11.29	410
Females	49	37.77	0.53	468.60	9.24	393

## Recommendations

1. Birth weight of camel calves varied from 31 to 45 kg with a range from 19 to 50 kg. Special care should be given to calves whose birth weight is less than 25 kg, especially during cold days.

2. As 66% of mortality cases occurred in the winter season, the dam near delivery should be transferred to a warm place where the calf will be kept under observation for a while. Special care should be provided to camels during their first delivery season.

3. Further studies about causes and preventive measures of mortality in camel calves are required.

4. More studies should be performed on the causes of weight variation between years under intensive management .

5. The growth rate of camel calves and their weight at three years of age indicate their suitability for fattening.

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## Résumé

**Al Mutairi S.E.** Evaluation des performances de chamelons dans des conditions d'élevage améliorées

Cette étude a été réalisée à la station de recherches camelines d'Al Jouf, Arabie saoudite, dans des conditions d'élevage améliorées sur le plan sanitaire et alimentaire. Au cours de 14 saisons 242 chamelons sont nés. Parmi eux 137 (56,6 p. 100) étaient des mâles et 105 (43,4 p. 100) des femelles. Le poids à la naissance de 239 chamelons a été relevé au cours des 14 saisons. Le poids moyen a été de 37,5 kg chez les 136 mâles et de 37,3 kg chez les 103 femelles. Le poids à la naissance dépendait de l'âge de la mère et de la saison. On a répertorié 38 cas de mortalité (13,7 p. 100) entre la naissance et l'âge de trois ans. Le poids moyen à trois ans des 32 mâles a été de 489,3 kg et celui des 49 femelles a été de 486,6 kg.

**Mots-clés :** Dromadaire - Jeune animal - Mortalité - Croissance - Arabie saoudite.

## Resumen

**Al Mutairi S.E.** Evaluación del rendimiento de camellos saudíes jóvenes bajo un sistema de manejo mejorado

El presente estudio se llevó a cabo en la estación de investigación del centro de investigación de desarrollo animal y ambiental en Al Jouf, Arabia Saudita, con un mejoramiento en el manejo alimenticio y en los cuidados veterinario. Durante 14 estaciones nacieron 242 camellos. Entre estos, 137 (56,6 %) fueron machos y 105 (43,4 %) hembras. Durante las 14 estaciones, se tomaron los pesos al nacimiento de 239 camellos. El peso promedio en 136 machos fue de 37,5 kg y de 37,3 kg en 103 hembras. El peso al nacimiento se vio afectado por la edad de la madre y la estación. Se registraron 38 (13,7 %) casos de mortalidad entre el nacimiento y tres años de edad. El peso promedio a los tres años fue de 489,3 kg y de 486,6 kg para 32 y 49 machos y hembras respectivamente.

**Palabras clave:** Dromedario - Animal joven - Mortalidad - Crecimiento - Arabia Saudita.